

REMARKS

This paper is being provided in response to the Final Office Action dated May 30, 2006, for the above-referenced application and accompanies a Request for Continued Examination (RCE) filed herewith. In this response, Applicant has cancelled claims 4, 6, 11, 18, 22, 23 and 36 without prejudice or disclaimer of the subject matter thereof (claims 5 and 12 having been previously cancelled) and amended claims 1, 7-9, 17, 24-26 and 35 to clarify that which Applicant considers to be the invention. Applicant respectfully submits that the amendments to the claims are fully supported by the originally-filed specification.

The rejection of claims 1-39 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,244,325 to Knohl (hereinafter “Knohl”) in view of U.S. Patent No. 3,812,756 to Wenger (hereinafter “Wenger”) and U.S. Patent No. 3,221,794 to Acres (hereinafter “Acres”) is hereby traversed and reconsideration is respectfully requested in view of the amendments to the claims contained herein. Applicant notes that although the Office Action indicates “Claims 1-39 have been examined,” claims 5 and 12 were cancelled in a prior amendment.

Independent claim 1, as amended herein, recites a device that attaches a first component to a second component. A sleeve is positioned in the first component and is axially aligned in the first component. A bolt is positioned in the sleeve and has a threaded front end that projects outwardly from the sleeve for screwing into a mating thread of the second component, and which is screwed into the sleeve with a slight radial play and held supported against axial forces. The bolt has a recess in its axial section accommodated in the sleeve and a spring lock washer located in the recess, whereby as the bolt is axially introduced into the sleeve, the spring lock washer is

pressed radially by the sleeve into the recess and engages radially behind an inner shoulder of the sleeve for axial support. A rear end of the sleeve includes a lead-in cone and, at the rear end of the sleeve in the direction of introduction of the bolt, the sleeve includes a collar that projects radially outward. An end section at a front end of the sleeve has a reduced wall thickness that is flanged outward. Further, the recess of the bolt includes a rear deep section and a front flat section for the spring lock washer that co-acts with the lead-in cone during introduction of the bolt into the sleeve and co-acts with the inner shoulder of the sleeve during detachment. The sleeve includes a first interior section in the direction of introduction of the bolt and an adjoining second interior section, an inner diameter of the first interior section substantially coinciding with an outer diameter of the bolt, and an inner diameter of the second interior section being expanded relative to the inner diameter of the first interior section, wherein said inner shoulder of the sleeve is formed by a transition from the first interior section to the second interior section, wherein the bolt includes a first shank section and a second shank section that are separated by said recess, and wherein an axial length of said first shank section of the bolt corresponds to an axial length of the first interior section of the sleeve.

Claims 2-4, 6-11 and 13-16 depend directly or indirectly on independent claim 1.

Independent claim 17, as amended herein, recites an attachment device. The device includes a substantially cylindrical sleeve having a hollow interior portion with a first interior section, an adjacent second interior section and an inner shoulder. An elongated bolt fits in the sleeve. A recess is formed on a portion of the bolt. An elastic member is disposed in the recess, wherein the elastic member radially compresses inwardly in response to the bolt being disposed in the first interior section. The elastic member radially decompresses outwardly to enable the

elastic member to engage the inner shoulder in response to the bolt being disposed in the second interior section. A rear end of the sleeve includes a lead-in cone and, at the rear end of the sleeve in the direction of introduction of the bolt, the sleeve includes a collar that projects radially outward. An end section at a front end of the sleeve has a reduced wall thickness that is flanged outward. Further, the recess of the bolt includes a rear deep section and a front flat section for the elastic member that co-acts with the lead-in cone during introduction of the bolt into the sleeve and co-acts with the inner shoulder of the sleeve during detachment. An inner diameter of the first interior section substantially coincides with an outer diameter of the bolt, and an inner diameter of the second interior section is expanded relative to the inner diameter of the first interior section, wherein said inner shoulder of the sleeve is formed by a transition from the first interior section to the second interior section, wherein the bolt includes a first shank section and a second shank section that are separated by said recess, and wherein an axial length of said first shank section of the bolt corresponds to an axial length of the first interior section of the sleeve. Claims 18-34 depend directly or indirectly on independent claim 17.

Independent claim 35, as amended herein, recites an attachment device. The device includes an elongated bolt and a means for accepting the elongated bolt. An elastic member is disposed on the bolt. A means for retaining the elastic member is formed on the bolt. A means for engaging the elastic member is included, wherein the elastic member radially compresses in response to the bolt being disposed in a first interior section of the means for accepting the bolt and wherein the elastic member decompresses and is engaged in response to the bolt being disposed in a second interior section of the means for accepting the bolt. A rear end of the means for accepting the elongated bolt includes a lead-in cone and, at the rear end of the means for

accepting the elongated bolt in the direction of introduction of the bolt, the means for accepting the elongated bolt includes a collar that projects radially outward. An end section at a front end of the means for accepting the elongated bolt has a reduced wall thickness that is flanged outward. Further, the recess of the bolt includes a rear deep section and a front flat section for the elastic member that co-acts with the lead-in cone during introduction of the bolt into the means for accepting the elongated bolt and co-acts with an inner shoulder of the means for accepting the elongated bolt during detachment. An inner diameter of the first interior section of the means for accepting the elongated bolt substantially coincides with an outer diameter of the bolt, and an inner diameter of the second interior section of the means for accepting the elongated bolt being expanded relative to the inner diameter of the first interior section, wherein said means for engaging the elastic member is formed by a transition from the first interior section to the second interior section, wherein the bolt includes a first shank section and a second shank section that are separated by said recess, and wherein an axial length of said first shank section of the bolt corresponds to an axial length of the first interior section of the means for accepting the elongated bolt. Claims 37-39 depend directly or indirectly on independent claim 35.

The Knohl reference discloses a fastener assembly with an axially slid able sleeve. The sleeve is slid able axially through a limited range along the shank of a threaded fastener. A resiliently yieldable retainer grips an unthreaded portion of the fastener shank and co-acts with the adjacent end of the thread to captivate the sleeve against slipping axially off of the fastener. (See Abstract, Figs. 5 and 6 of Knohl.)

The Wenger reference discloses a positive lock self-retained fastener. The Office Action cites especially to Figure 5 in which is shown a thread bolt provided with a nut 51 that is the primary holding means. A retaining ring 21 is disposed in a groove 20 and the outside diameter of the ring is greater than the minor or root diameter of the thread shank surface. (See col. 6, line 65 to col. 7, line 7 of Wenger.)

The Acres reference discloses a captive fastener including a screw 10 and shank 14 that is provided with a stepped groove 20. A split retaining ring 26 is placed on the screw 10. (See col. 3, lines 1-72 and Figs. 1, 2 of Acres.)

According to the each of the references of Knohl, Wenger and Acres, a split ring is used only as a retainer ring in order to ensure that the bolt remains in its position and cannot be lost. Therefore, according to Knohl, the retainer ring 55 abuts against the inner shoulder (bead) 60 when the bolt shank 40 is nearly completely out of the sleeve 36 and with its thread 45 out of engagement from the hole 23 of the second component 22. According to Acres, the retainer ring 26 abuts against the inner shoulder 40 only when the bolt shank 14 is above surface 42 of the first component 34 and the threads 25 of the bolt 12 are nearly completely within the bore 38 of the first component 34 and out of engagement of the hole 48 of the second component 46 (see Figs. 3-5 of Acres). According to Wenger, the retainer ring 21 is positioned at the end of the bolt 10 protruding beyond the joined first and second components of work piece 32 (see Fig. 1 of Wenger).

In contrast to these references, according to the present claimed invention and referring to Figure 1 for purposes of explanation only, the retainer ring 3 abuts against the inner shoulder 104 of the sleeve 102 immediately when the bolt 20 is screwed out of the threaded bore hole 300b' of the second component. Therefore, the two components 300a and 300b are pressed away from each other by the thread when the components are disassembled by screwing out the bolt 20. This function is described in the originally-filed specification on page 10, line 11 to page 11, line 7 and page 2, line 21 to page 3, line 4. In order to enable this function, the rear first section 102 of the sleeve 10 and the first shank section 203 of the bolt have a *corresponding axial length* (see page 7, lines 12-14 of the original specification). Further, the inner shoulder is provided in a separate sleeve because the inner shoulder has to support the entire force of the bolt 20 when the two components are pressed away from each other (see page 11, lines 5-7 of the original specification).

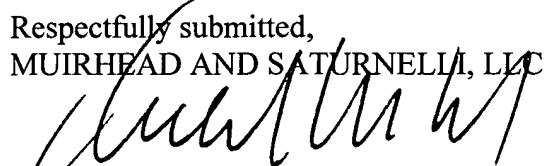
As amended herein, Applicant's independent claims recite at least the features of an attachment device including a bolt and sleeve, the sleeve having first and second interior sections of different inner diameters, the transition between the first and second interior sections forming the inner shoulder of the sleeve, and the bolt having first and second shank sections separated by the recess, wherein an axial length of said first shank section of the bolt corresponds to an axial length of the first interior section of the sleeve. Applicant notes the discussion in the Office Action concerning Knohl in relation to former claims 4 and 11 (having subject matter incorporated into the independent claims herein). The Office Action cites to sleeve 36 of Knohl and specifically element 49 as a "first section" and element 48 as a "second section" thereof, and bead 60 as an "inner shoulder" at the transition between the first and second

sections. As detailed above, Applicant has clarified the respective positions and sizes of first and second sections of the sleeve in relation to first and second shank sections of the bolt with the recess therebetween. Applicant respectfully submits that Knohl does not teach or fairly suggest the above-noted features as recited by Applicant. Further, Applicant submits that Wenger and Acres fail to overcome the above-noted deficiencies of Knohl with respect to Applicant's presently-claimed invention.

Accordingly, Applicant respectfully submits that neither Knohl, Wenger nor Acres, taken alone or in any combination, teach or fairly suggest at least the above-noted features as claimed by Applicant. In view of the above, Applicant respectfully request that the rejections be reconsidered and withdrawn.

Based on the above, Applicants respectfully request that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 508-898-8603.

Respectfully submitted,
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